CIO-2069

National Imagery and Mapping Agency

Common Imagery Interoperability Profile (CIIP) for Imagery Access

13 March 1997

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CHANGE LOG

Date	Pages Affected	Mechanism
24 June 1996	All	RFC 00A-311 (Initial Issue)
13 March 1997	All	RFC 00A-0318

EFFECTIVITY LOG

Number	Effective	Description
E01	3Q97	Early Library Capabilities (IDEX)
E02	3Q98	NIMA Library 0.5
E03	3Q99	NIMA Library 1.0
E04	TBD-028	DE Implementation of IAS APIs
E05	TBD-029	CIP Implementation of IAS APIs
E06	TBD-030	IESS Implementation of IAS APIs
E07	TBD-031	NES Implementation of IAS APIs
E08	TBD-032	ESS Implementation of IAS APIs

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1 *Executive Overview*

The Common Imagery Interoperability Profile (CIIP) for Image Access defines the profile for software interface standards to be used to achieve interoperability between multiple clients and servers within the United States Imagery and Geospatial System (USIGS) architecture.

Key interoperable interfaces are defined along with key data interchange standards to assure interoperability among heterogeneous systems. Profiles are defined to support compatibility across multiple library implementations. As required, the profiles will be extended to include definitions of other USIGS interfaces. Interfaces for commercial off-the-shelf (COTS)-based exploitation systems and integration of Government off-the-shelf (GOTS)-based tools and services will be included in future revisions to provide guidance for both Government and vendor (commercial) developers of software. The goal of this document is to facilitate development by multiple providers of responsive products that fit within this USIGS architecture.

The audience for this document consists of:

1. Government developers of imagery and geospatial libraries;
2. Government developers of exploitation tools;
3. and Commercial developers of libraries, exploitation applications, and tools.

1.1 **Background**

The intelligence and DoD communities are defining a common computing environment based predominately on commercially developed technology and standards. Implementations that will make up the USIGS must operate within this environment.

1.2 Purpose

1.2.1 *Use by Designers and Builders*

The designers and builders of systems will use this standards profile to define the boundaries within which the application software is to be built. The boundaries are defined in terms of standards that define an application program interface (API) and the services that are provided through the API, as well as communication protocols and data formats.

1.2.2 *Use by Procurement Authorities*

This standards profile will be used by procurement authorities to define clearly the requirements that must be met by vendors and development contractors.

1.3 Objectives

The imagery community needs a flexible, community wide framework based on a platform-independent distributed computing technology based on common interfaces between software components. This framework will minimize coordination/interaction between developers, but still facilitate interoperability within the specified target USIGS environment.

The imagery information infrastructure is being structured and specified such that independent development and procurement efforts can deliver system components that are easily inserted and integrate into the evolving environment. The architecture, interfaces, and profiles of the Common Imagery Interoperability Facilities (CIIF) and other USIGS Standards will provide "pre-coordination" among component managers.

The emphasis is to define interfaces sufficiently to specify functionality, but not limit or constrain individual implementations.

The CIIP for Image Access is intended to define the implementation details of the key software interfaces required for the interaction within and among the Library and Exploitation elements of the USIGS architecture. In addition to its use by government developers of these elements, it is required that commercial vendors develop products that adhere to these interfaces.

1.4 Scope

This document defines the key interfaces and applicable specifications to the services necessary to add/import new data to the USIGS Libraries, query, search and retrieve data from those libraries, as well as transfer geospatial data, imagery and image-based products between any elements of the USIGS architecture. These interfaces have been defined to support the requirements of the National Imagery and Mapping Agency (NIMA) A3I Program and the Defense Airborne Reconnaissance Office (DARO) Common Imagery Ground/Surface System (CIG/SS) Program. Other Common Imagery Interoperability Facilities described in the NIMA CIIF Reference Model will be included in subsequent updates as interface specifications are developed to support other programs such as the NIMA Exploitation Initiative.

1.5 Approach

The CIIP provides a standards-based approach to integrating custom developed, COTS, and GOTS applications in a distributed environment. These profiles are intended to provide major interoperability benefits.

The fundamental principle of the CIIP is *common interfaces*. Common interfaces are API that are shared by all subsystems in an integrated system and/or all systems in an integrated architecture. They are generic interfaces supported by many types of application software. The architecture will evolve by adding new common interface applications without modifying existing software and allowing independent client and server implementations. This approach contrasts with the traditional *application-specific interfaces* where each application publishes a unique set of interfaces.

The CIIP profiles a set of common standards that support basic interoperability. The current profile definition supports *Image Access* which includes the software interfaces required for:

a) a user to query and retrieve images and image-based products that match their information needs,
b) creation of new products and their entry to the libraries with associated metadata,

c) establishment of user profiles to provide notification of new images and image-based products that match their information needs, and
d) delivery of images and image-based products from the libraries or other element to a user-designated location.

As they are defined, *Exploitation Support and Geospatial* software interfaces will be added to this document.

1.6 Document Organization

This document is organized as follows:

Section 1 - *Executive Overview* contains overview and background material for the CIIP.

Section 2 - *Applicable Documents* contains the list of other documents cited or referenced in the CIIP. Together with the CIIP, these documents provide the information needed to understand and implement the CIIP.

Section 3 - CIIP *Architectural Context* outlines the applicability of the interfaces included in the CIIP within the USIGS architecture.

Section 4 - *Interoperability Requirements* contains the specific standards-related requirements for each System participating in the USIGS architecture and effectivities for introduction of these capabilities.

Section 5 -*Verification* contains the methods for assuring compliance to the profiles contained in this document.

Section 6 - *Notes* contains definitions and other information that may be useful to the reader.

Section 7 - Appendices - *NITF Header Specifications* contains details for populating NITF 2.0 header and sub-header fields.

A3I Scenarios and Use Cases contains several scenarios by which users might utilize the capabilities provided by these interfaces within the A3I context.

1.7 Document Hierarchy

There are multiple tiers of documents specifying the USIGS common imagery interfaces. Standards are designed to be as broadly applicable as possible and therefore only contain the most general features and data structures. These general features can be used in many different ways by different domains. However, to guarantee interoperability within a specific domain, everyone using those standards, i.e., developers of client and server implementations, must use them in a consistent manner. These lower level *profiles* serve to document a specific community's standards, conventions, and agreed-to procedures on how that general standard is tailored to that community's requirements. Without these lower level implementation documents to specify the details, it is unlikely that any two developers would make exactly the same interpretation of how to use the standards.

In addition, it is intended that these standards can be extended to accommodate requirements that may be unique to a subset of the total community. The lowest tier documents can contain the implementation details of these extensions without affecting the higher tier documents.

To be most useful, each lower tier profile should contain the following information:

1. Role of the implementation within the overall architecture
2. Scenarios for use
3. Assumptions, limitations, and constraints that need to be reflected in the implementation or use
4. Related facilities. Used with… based on…
5. Metadata that must be provided by service or available from other services
6. Context requirements

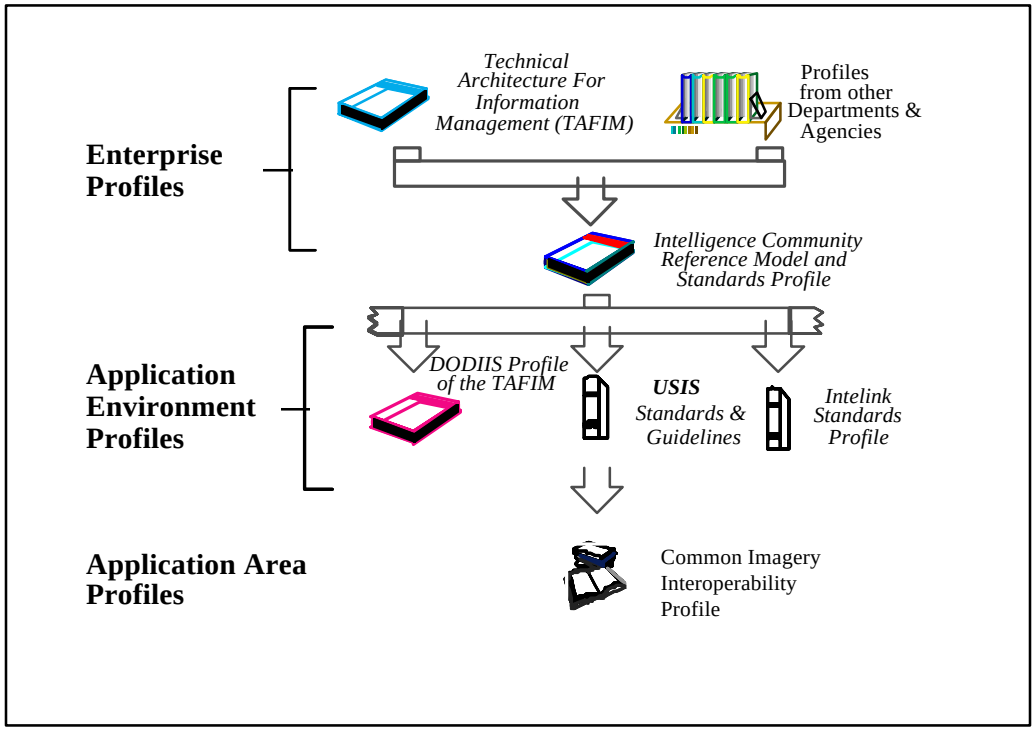


Figure 1.7-1. CIIP Document Hierarchy

Figure 1.7-1 shows the hierarchy of documents relating to the CIIP. The CIIF Reference Model, Facility Specifications such as the IAS Specification, and Facility Test Plan are broad specifications applicable to the entire USIGS. They are controlled by the Imagery Standards Management Committee (ISMC). Currently, IAS Specification is being controlled as a development specification as guidance to developers with the objective of migrating the IAS Specification to an ISMC standard after it has been validated through the development process.

This document, the CIIP, is applicable to the USIGS development programs being managed by NIMA and other organizations. It contains lower level specifications and usage conventions for those NIMA standards required by these initiatives. It serves to define a common baseline for those developments making up these initiatives and is controlled by the NIMA SU Configuration Control Board (SUCCB) and referenced in all requirements documents within

NIMA and other Program Offices developing software as part of these initiatives.

At the lowest tier, the development program offices may use locally-controlled documents to specify extensions to the CIIP and/or more specific implementation details. These lowest tier documents may also specify effectivities reflecting phased implementation or compliance to the CIIP.

The intent of all documents is to include the implementation specifics at the highest level of commonality. In some cases, details developed for lower tier documents may migrate to higher tier documents and be replaced by pointers to the higher tier document.

2 *Applicable Documents*

2.1 Government Documents

2.1.1 *NIMA Documents*

The following documents of exact issue shown (identified by revision letter only) and authorized changes form a part of this specification to the extent specified herein:

1. *Military Handbook for the National Image Transmission Format Standards (NITFS),* MIL-HDBK-1300A, 12 October 1994
2. *National Image Transmission Format (NITF) (Version 2.0) for the National Image Transmission Format Standards (NITFS),* MIL-STD-2500A, 12 October 1994
3. *Support Data Extensions (SDE) (Version 1.1) for the National Imagery Transmission Format (Version 2.0) of the National Imagery Format Standard*, 15 April 1995, TCS-037-011/95, (CIO-2047)
4. *Central Imagery Office United States Imagery System Standards Profile for Imagery Archive (SPIA),* Version 1.0, 20 July 1994 (CIO ASD SIA 0594 0000)
5. *Central Imagery Office United States Imagery System Standards Profile for Image Distribution (SPID),* Version 1.0, 13 October 1995, (CIO-2019)
6. *Imagery Access Services Specification, Version 1.1,* 13 March 1997, (CIO-2068).
7. *Joint Photographic Experts Group (JPEG) Image Compression for the National Image Transmission Format Standards (NITFS),* MIL-STD-188-198A, 15 December 1993 with Change Notice 1, 12 October 1994
8. *National Imagery Transmission Format Standards (NITFS) Certification Test & Evaluation Program Plan*, JIEO Circular 9008, 30 June 1993 with Errata Sheet dated 24 July 1996.
9. *Computer Graphics Metafile (CGM) Implementation Standard for the National Image Transmission Format Standards (NITFS),* MIL-STD-2301, 18 June 1993 with Change Notice 1, 12 October 1994

10. *Profile for Imagery Archive Extensions (PIAE) Version 2.0 for the National Imagery Transmission Format (Version 2.0) of the National Imagery Transmission Format Standards (NITFS),* 25 April 1996
11. *Test and Evaluation Master Plan (TEMP) for the Accelerated Architecture Acquisition Initiative (A3I), Revision 2,* 2 December 1996, (CIO-2039)
12. *Airborne Synthetic Aperture Radar (SAR) Support Data Extensions for the National Imagery Transmission Format (Version 2.0) of the National Imagery Transmission Format Standards, Version 0.9,* 20 May 1996.
13. *Visible, Infrared, and Multispectral Airborne Sensor Support Data Extensions (SDE) for the National Imagery Transmission Format (Version 2.0) of the National Imagery Transmission Format Standards (Draft),* 20 November 1996.

2.1.2 *Program Office Documents*

The following documents of exact issue shown (identified by revision letter only) and authorized changes form a part of this specification to the extent specified herein:

1. *CIO to National Photint Programs Interface Specification (IF200EAA)*
2. *CIO to National Photint Programs Interface Specification (IF300EAA)*
3. *Tape Formats Requirements Document (TFRD),* S2025P, TCS-055B-BA02767-93
4. *National Image Transmission Format Implementation Requirements Document (NITFIRD),* S2035A, TCS055B-BA00039-95
5. *Interface Control Document for IPL 1.0,* 1947089B, 30 August 1996

2.2 Non-Government Documents

2.2.1 *Other Standards Documents*

1. *Tagged Image File Format (TIFF) Revision 6.0,* June 3, 1992
2. *CORBA: The Common Object Request Broker Architecture and Specification, Revision 2.0,* Object Management Group, Framingham, MA, OMG Document Number 93.12.43, December, 1993.
3. T. Berners-Lee, L. Masinter, and M. McCahill. *Uniform Resource Locators (URL).* RFC 1738, CERN, Xerox PARC, University of Minnesota, December, 1994.

4. ISO / IEC 12087-2, *Programmers Imaging Kernel System (PIKS)*
5. ISO / IEL 13818, *Motion Picture Experts Group (MPEG) Document-2*

2.3 **Other Documents**

These documents provide additional information which may facilitate a reader's understanding of the material contained within this volume:

1. *Central Imagery Office (CIO) Common Imagery Interoperability Facilities Reference Model*, Version 1.0, 8 May 1996
2. *A3I User's Concept of Operations (CONOPS)*, 10 October 1995
3. *Community Imagery Needs Forecast*
4. *Technical Architecture Requirements Document (TAR)*, Version 3.0, 12 April 1995
5. *United States Imagery System (USIS) Architecture Migration Plan*
6. *USIS Functional Managers Architecture Guidance FY 98-03 (Final)*, Version 0.1, November 1995
7. *USIS Initiative Definition Document (IDD) for the A3I*, Version 1.3, 14 December 1994
8. *USIS Objective Architecture Definition and Evolution*, Version 3.0 (CIO-2003), 12 April 1996
9. *USIS Objective (Target 1) Concept of Operations (CIO-2065), Version 3.0, 12 April 1996*
10. *USIS Standards and Guidelines*, Version 1.0, 13 October 1995
11. *USIS 2000 CONOPS*
12. *CORBAfacilities: The Common Facilities Architecture*, Version 4.0, Object Management Group, Framingham, MA, November, 1995.
13. *CORBAservices: Common Object Services Specification*, Revised Edition, Object Management Group, Framingham, MA, March, 1995.
14. *Object Query Service Specification: Joint Submission*, Document 95.1.1, Object Management Group, Framingham, MA, December, 1993.
15. *The Central Imagery Office (CIO) and IMINT Directorate Joint Requirements Document for the United States Imagery System (USIS) 2000 Accelerated Architecture Acquisition Initiative (A3I)*, Version 1.0, 18 January 1996 (CIO-2042)

16. *The Central Imagery Office (CIO) A3I Requirements Document (ARD)* , Version 2.0, 7 May 1996.

17. *Central Imagery Office (CIO) and Rome Laboratory Joint Requirements Document for the United States Imagery System (USIS) 2000 Accelerated Architecture Acquisition Initiative (A3I) (CIO-2045),* 24 June 1996

18. *NIMA Library Requirements Document,,* V2.0, (NLRD-001), 13 February 1997

3 *CIIP Architectural Context*

3.1 USIGS Library and Dissemination Architecture

The USIGS Architecture is shown in Figure 3.1-1.

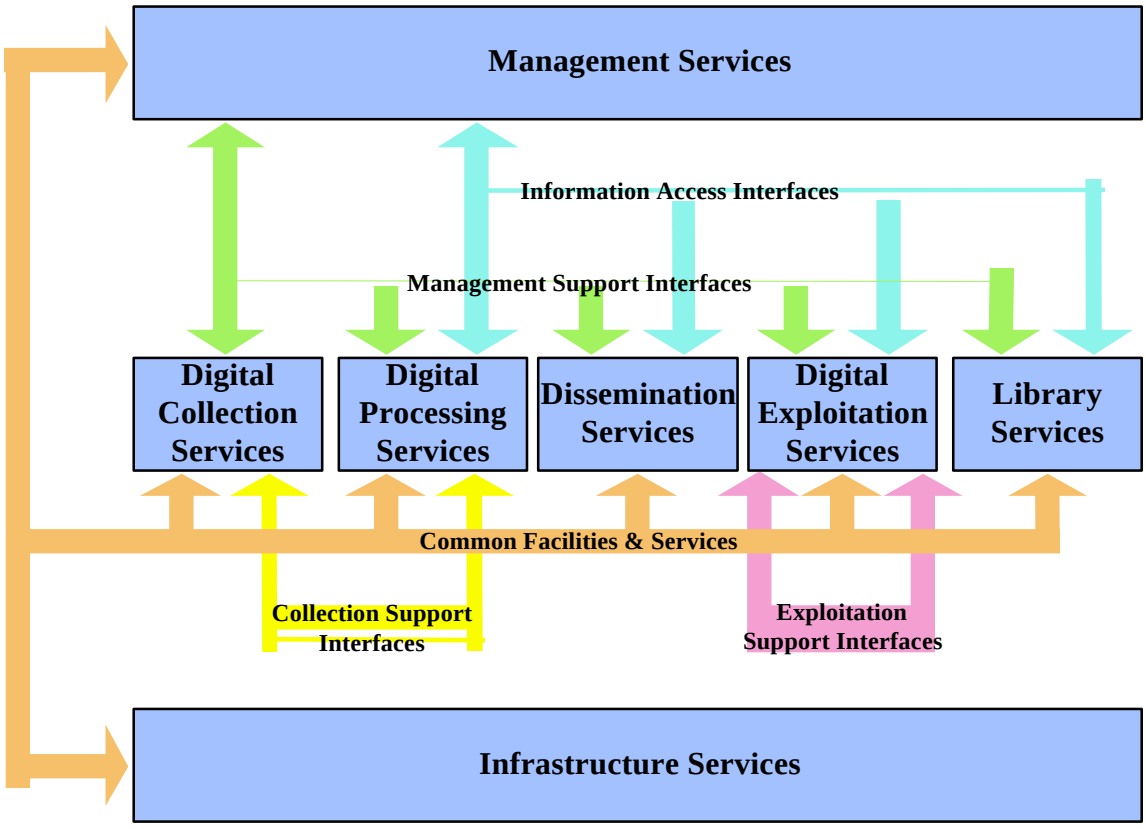


Figure 3.1-1 - USIGS Architecture and Common Interfaces

The USIGS architecture includes the Library and Dissemination elements and the Information Access interfaces between those elements and other elements of the architecture.

3.1.1 *USIGS Image Access Services*

USIGS Image Access Services Architecture is shown in Figure 3.1.1-1.

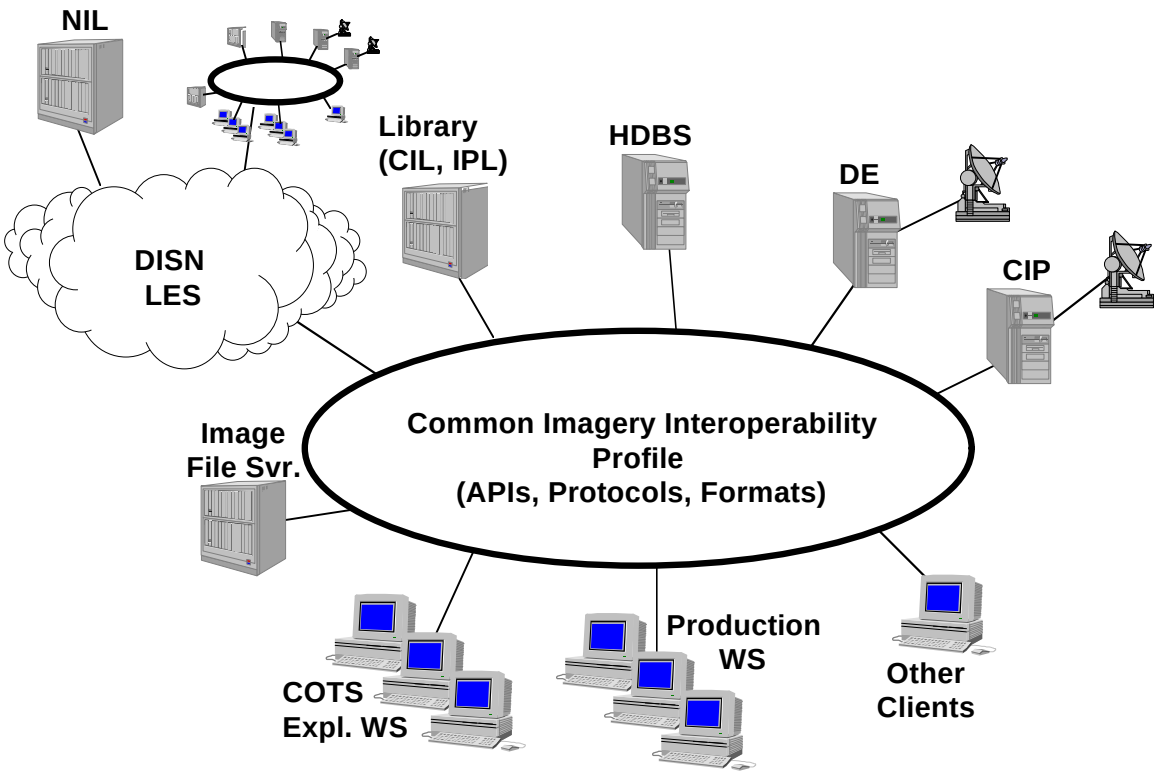


Figure 3.1.1-1 - USIGS Image Access Services Architecture

The following services are elements of the USIGS Image Access Architecture and as such will implement the interfaces specified in Section 4 of this document:

1. Library Services provided by the National Imagery Library (NIL), Command Imagery Libraries (CIL), and Image Product Libraries (IPL)
2. Primary Dissemination Services provided by the Dissemination Element (DE)
3. Exploitation Services provided by commercial applications augmented by Government Off-the-Shelf (GOTS) modules
4. Product Generation Services provided by workstation-based applications such as Target Materials Workstation (TMWS)
5. Exploitation Management Services provided by Host Data Base Systems such as Image Exploitation Support System (IESS)
6. Dissemination Management Services provided by Host Data Base Systems such as Image Exploitation Support System (IESS)
7. Digital Processing Services such as provided by the Common Imagery Processor (CIP) for Tactical data

3.1.2 *Client Applications*

The availability of a set of common, open interface specifications for image access provides flexibility for the development of client applications. In some cases developers may choose to integrate some or all of the interfaces within a workstation application to provide a seamless view to the user. Other situations may require development of a client which implements a group of interfaces to support a set of functional requirements. Finally, although least desirable, a client application may be developed to support a specific server implementation of these interfaces.

Client applications within the A3I architecture will be resident on Commercial Analyst Workstations (CAWS) or other COTS-based exploitation workstations. In addition, workstations providing image-based product generation, all-source analysis tools, or any other function requiring access to the USIGS Image Libraries will host CIIP-compliant clients.

3.2 **Image Access Services Interfaces**

The interfaces specified in the Image Access Services Specification, Version 1.1 support the following A3I functional requirements:

1. Query - The ability for a user to determine if a library contains data meeting specific criteria.
2. Response - The ability for a library to return the results of a query to the user.
3. Request - The ability to initiate a transfer of data from one location to another designated location.
4. Disseminate - The ability to transfer data from one location to another designated location.
5. Store - The ability to add new data to a library.
6. Profile - The ability to register an interest profile with a library or dissemination element which will notify a user when new data meeting specific criteria is received by that element.
7. Notify - The ability to inform a user that new data has been received meeting specific interest criteria.

Table 3.2-1 indicates the interaction between the Image Access Services and clients.

TO: FROM:	Primary Dissem. Services	Library Services	Expl. Services	Product Gen. Services	Expl. Mgmt. Services	Dissem. Mgmt. Services	Gen. Library Client	Digital Proc. Services
Primary Dissem. Services		D	Rs,D,N	Rs,D,N	Rs, N		Rs, N	
Library Services		Rq,D,P	Rs,D,N	Rs,D,N	N		Rs,D,N	
Exploitation Services		Q,Rq,S,P	D	D		Rq		
Product Gen. Services		Q,Rq,S,P	D	D				
Exploitation Mgmt. Services	Rq,P	Rq,P	N			Rq		Rq
Dissem. Mgmt. Services	Rq							Rq
Gen. Library Client		Q,Rq,S,P						
Digital Proc. Services		D			N			

KEY FOR TABLE

Q=Query Rs=Response Rq=Request P=Profile N=Notify S=Store D=Disseminate

Table 3.2-1 Image Access Interface Interaction (TBR-007)

3.3 Referenced Standards

3.3.1 *National Imagery Transmission Format Standards (NITFS)*

The *National Imagery Transmission Format (NITF*), is the preferred image file format standard published and maintained by the NIMA. NITF is an imagery

compound document specification that enables the storage of imagery and many image-related products along with the applicable metadata in a single file. Support for NITF is required for exploitation tools. The Image Access Facility (IAF) will fully support NITF image transfers, but will also support TFRD, TIFF and others.

A set of *Support Data Extensions (SDEs) to NITF 2.0* have been defined to contain the Exploitation Support Data (ESD) as described in IF200EA/IF300EA for National imagery in the NITF file structure. SDEs for tactical and commercial imagery are also being developed.

3.3.2 *Standards Profile for Image Distribution (SPID)*

The *Standards Profile for Image Distribution (SPID)* provides definition and identification of the specific industry and government standards necessary to allow connectivity of distributors and users systems for transfer of image files. It defines network, format, and protocol standards for electronic transfer as well as standards for media distribution of imagery.

3.3.3 *Standards Profile for Image Archives (SPIA)*

The *Standards Profile for Imagery Archives (SPIA)* provides definitions of applicable terminology, references, rationale, and identification of recommended standard data directory elements for imagery archives.

A set of *Profile for Imagery Archive Extensions (PIAE) to NITF 2.0* have been defined to contain the applicable SPIA data elements within the NITF file structure.

3.3.4 *Image Access Services (IAS) Specification*

The *IAS Specification* addresses the core APIs of the USIGS for client access to imagery and image-based products. The supported operations include image product discovery, metadata attribute retrieval, whole product retrieval, image region retrieval, and client product creation.

The *IAS Specification* defines the APIs for the IAF, the Catalog Access Facility (CAF), and the Profile and Notification Facility (PNF) defined in the *Common Imagery Interoperability Facilities (CIIF) Reference Model*.

4 *Interoperability Requirements*

4.1 Imagery Access Interoperability Requirements

This Section contains the minimum set of requirements needed to achieve interoperability between Systems exchanging imagery and image-based product data within the USIGS.

The following USIGS Systems shall conform to the interoperability requirements specified in paragraph 4.1:

1. National Image Library (NIL)
2. Command Image Library (CIL)
3. Image Product Library (IPL)
4. Dissemination Element (DE) (E04)
5. Commercial Exploitation Systems
6. Other Client Applications requiring access or interface to the A3I Libraries
   a) DARO Common Imagery Processor (CIP) (E05)
7. Exploitation / Dissemination Management System(s):
   a) Image Exploitation Support System (IESS) (E06)
   b) National Exploitation System (NES) (E07)
   c) Exploitation Support System (ESS) (E08)

Unless explicitly specified otherwise, the effectivity for all requirements in this paragraph shall be E01.

4.1.1 *Standard Computing Environment*

4.1.1.1 Distributed Computing Services

Systems shall utilize a common set of Distributed Computing Services for exchanging information as specified in *CORBA: The Common Object Request Broker Architecture and Specification, Revision 2.0.*

4.1.1.1.1 *Object Request Broker Interoperability*

Object Request Brokers (ORBs) utilized for the USIGS shall support the Internet Inter-ORB Protocol (IIOP) for inter-ORB communication.

4.1.2 ***Standard Application Interfaces***

4.1.2.1 Common Imagery Interoperability Facilities

Systems shall conform to the Application Program Interfaces (API) as defined in *Imagery Access Services Specification, Version 1.1*, per Table 4.1.2.1-1. Table 4.1.2.1-1 indicates whether the system is a *bearer* (B) or presenter of the interface, the *audience* (A) or caller of the interface, or both. Effectivities are indicated as appropriate.

Interfaces in Table 4.1.2.1-1 shall be implemented by each specified USIGS System in accordance with the implementation details specified in paragraph 4.1.2.1.1.

	IDEX (E01)		**NIMA Library (E02)**		**DE (E04)**		**Expl Sys. (E02)**		**IESS (E06)**		**NES (E07), ESS (E08)**		**CIP (E05)**		**Other Clients (E01)**	
	B	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**
Server																
open	X	X	X	X	X			X		X		X	X			X
close	X	X	X	X	X			X		X		X	X			X
Parameters																
get_parameters	X	X	X	X	X			X		X		X	X	X		X
set_parameters	X	X	X	X	X			X		X		X	X			X
CatalogAccess																
boolean_query	X	X	X	X	X			X								X
elliptical_query	X	X	X	X				X								X
point_query	X	X	X	X				X								X
polygonal_query	X	X	X	X	X			X								X
get _results	X	X	X	X	X			X								X

	IDEX (E01)		NIMA Library (E02)		DE (E04)		Expl Sys. (E02)		IESS (E06)		NES (E07), ESS (E08)		CIP (E05)		Other Clients (E01)	
	B	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**
free_results	X	X	X	X	X			X								X
ImageAccess																
get_subimage	X		X		X			X		X		X				X
ProductRequest																
disseminate	X	X	X	X	X			X		X		X	X			X
check_completion	X	X	X	X	X			X		X		X	X			X
cancel	X	X	X	X	X			X		X		X	X			X
create	X	X	X	X				X		X		X				X
ArrayRequest																
open_array	X		X					X								X
close_array	X		X					X								X
get_region	X		X					X								X
get_multiple_regions	X		X					X								X
Profile&Notification																
list_queries	X	X	X	X	X			X		X		X				X
remove_query	X	X	X	X	X			X		X		X				X
request_notification	X	X	X	X	X			X		X		X				X
request_push	X	X	X	X	X			X		X		X				X
PNF_Callback																
notify	X	X	X	X		X	X		X		X				X	

Table 4.1.2.1-1 - USIGS Implementation of Imagery Access Services (TBR-002)

4.1.2.1.1 *Image Access Services Facilities Implementation Details*

4.1.2.1.1.1 Image Access Facility

Systems shall implement the Image Access Facility as specified in the *Image Access Services Specification, Ver. 1.1 Ver. 1.0* in accordance with the information specified in this paragraph.

Item	Definition	Value
LocationSpec	General form of data type to define destination and source locations. A type “any”.	This type “any” will always contain a type ImageLocationSpec.
creation_attributes	NameValueList containing metadata describing the image being submitted to the “create” method.	For each NameValue struct: “name”= element from Table 4.1.2.1.1.3.1.1-1; “value”= string containing desired value.
RegionSpec	General form of data type to define characteristics of an image tile. A type “any”.	This type “any” will contain a type DisplayRegionSpec or a TileRegionSpec. (See RegionData)

Item	Definition	Value
RegionData •region_spec	Data type to define the location of this region with respect to the source image from which it is taken	This type "any" will contain a type DisplayRegionSpec when used in the get_region method and will contain a TileRegionSpec when used in the get_multiple_region method. (See description of DisplayRegionSpec and TileRegionSpec)
•region_header	A NameValueList containing the metadata describing the data contained in this region.	
	General Metadata: HorizontalVertical Size VerticalHorizontal Size Pixel DepthResolution	 "NCOLS" = number of columns in the image (N8) "NROWS" = number of rows in the image (N8) "PixelDepth" = number of significant bits per pixel (N2)

Item	Definition	Value
•region_header (cont)	**National Support Metadata**: Per *Support Data Extensions (SDE) (Version 1.1) for the National Imagery Transmission Format (Version 2.0), CIO-2047*, for the following extensions: • STDID • USE26 • USE03 • IMBLK • SECTG • RPC00 • STREO • MPD26 • MPD03 • MOD26 • IMS00 • REFLN • MEN35 • ACI35 • PAT35 (note 1) (note 2) • ICHIP Per Paragraph 4.1.4.2.5.2	For each NameValue struct: “name”= SDE name (e.g. STDIDA); “value”= string containing data as defined in CIO-2047

Item	Definition	Value
•region_header (cont)	**Tactical Support Metadata**: **-SAR** Per *Airborne Synthetic Aperture Radar (SAR) Support Data Extensions for the National Imagery Transmission Format (Version 2.0) of the National Imagery Transmission Format Standards, Ver. 0.9, 20 May 1996.*	For each NameValue struct: "name"= SDE name (e.g. STDIDA); "value"= string containing data as defined in document
	-EO, IR, MS Per *Visible, Infrared, and Multispectral Airborne Sensor Support Data Extensions (SDE) for the National Imagery Transmission Format (Version 2.0) of the National Imagery Transmission Format Standards (Draft), 20 November 1996.*	For each NameValue struct: "name"= SDE name (e.g. STDIDA); "value"= string containing data as defined in document

Item	Definition	Value
•element_type	The data type of the pixels contained within the region_data element: binary, unsigned bytes, signed bytes, unsigned short integers, signed short integers, unsigned long integers, signed long integers, floating point, complex numbers, double precision floating point, other representations (Per ISO / IEC 12087-2 Programmers Imaging Kernel System (PIKS))	 “BITDATA” “BYTEDATA” “SBYTEDATA” “INT2DATA” “SINT2DATA” “INT4DATA” “SINT4DATA” “FLOAT4DATA” “COMPLEXDATA” “FLOAT8DATA” default case
•region_data	A Buffer type containing the pixel data.	Actual pixel values.
Access Kind Specification	N / A	N / A

Item	Definition	Value
open_criteria	A NameValueList containing information needed to identify and authorize a user to open a server.	"UserID" = recognized and valid user identifier or login "Password" = the corresponding password for the submitted User ID
Client Context Information	N / A	N / A

note 1: Specific subset of extensions will vary depending on sensor type as defined in CIO-2047.

note 2: A mapping of TFRD support data elements to NITFS Support Data Extensions (SDE) can be found in *National Image Transmission Format Implementation Requirements Document (NITFIRD)* S2035A.

Table 4.1.2.1.1.1-1 -Image Access Facility Implementation Detail (TBR-003)

4.1.2.1.1.2 Image Access Services Parameters

Systems shall implement the Image Access Services Facilities as specified in the *Image Access Services Specification, Version. 1.1* in accordance with the parameter information specified in Table 4.1.2.1.1.2-1.

In order to provide a minimal access control for the ImageProduct object, the following string shall be passed as the value of the ContextInfo string that accompanies the invocation of the get_parameter and set_parameter methods :

"username=`USERID',password=`PASSWORD'"

where USERID is replaced by a recognized user identification and PASSWORD is replaced by the corresponding password. The beginning and ending quotes are not part of the string.

Item	Definition	Value
Parameters		
IA	**Resettable:**	
	ProductRRDS	sequence(unsigned long) = 0 - 7
	RegionParameters	RegionParameter
	GeographicDatum	string = “WGS84”
	ProductCompression	string containing one of the following values: “JPEG12VL” “JPEG12DQ” “JPEG8” “JPEG24” “UNC” ”TFRD43” “TFRD23” “TFRD13” “ARIDPCM” “MPEG-2”
	ProductDataFormat	string containing one of the following values: “NITF11” “NITF20” “TFRD” “TIFF60” “RASTER” “MPEG” “GIF” “POSTSCRIPT” “DTED” “MPEG-2”

Item	Definition	Value
IA (cont)	HorizMotionRate (pixels/sec) VertMotionRate (pixels/sec)	long long
	ReadOnly: ParameterNames	NameValueList = ProductRRDS = TRUE RegionParameters = TRUE GeographicDatum =TRUE ProductCompression =TRUE ProductDataFormat = TRUE ParametersName =FALSE InterfacesSupported= FALSE
	InterfacesSupported	NameValueList “IA” = IA object reference “CA” = CA object reference “PN” = PN object reference

Item	Definition	Value
CA	**Resettable:**	
	ResultAttributes	Per Table 4.1.2.1.1.3.1.1-1 plus "NITF Image Sub-File Sequence Number" (N2=01-20)
	GeographicDatum	string = "WGS84"
	BrowseImageReturned	Boolean
	ReadOnly:	
	ParameterNames	NameValueList ResultAttributes= TRUE GeographicDatum =TRUE BrowseImageReturned =TRUE ParameterNames =FALSE InterfacesSupported =FALSE AvailableAttributes =FALSE QueryableAttributes =FALSE MaxPolygonVertices = FALSE

Item	Definition	Value
CA (cont)	InterfacesSupported	NameValueList "IA" = IA object reference "CA" = CA object reference "PN" = PN object reference
	AvailableAttributes	Per Table 4.1.2.1.1.3.1.1-1 plus "NITF Image Sub-File Sequence Number" (N2=01-20)
	QueryableAttributes	Per Table 4.1.2.1.1.3.1.1-1
	MaxPolygonVertices	unsigned long

Item	Definition	Value
ImageProduct	**Resettable:** N / A	
	ReadOnly:	
	ParameterNames	NameValueList ParameterNames =FALSE ReferenceAttributes= FALSE ArrayProduct = FALSE LibraryReference= FALSE
	ReferenceAttributes	"NCOL" = number of columns in image (N8) "NROWS" = number of rows in image (N8)
	ArrayProduct	Boolean IA object reference
	LibraryReference	

Item	Definition	Value
PNF		
	Resettable:	
	ResultAttributes	Per Table 4.1.2.1.1.3.1.1-1 plus "NITF Image Sub-File Sequence Number" (N2=01-20)
	GeographicDatum	string = "WGS84"
	BrowseImageReturned	Boolean
	ReadOnly:	
	ParameterNames	NameValueList ResultAttributes= TRUE GeographicDatum =TRUE BrowseImageReturned =TRUE ParameterNames =FALSE InterfacesSupported =FALSE AvailableAttributes =FALSE QueryableAttributes =FALSE MaxPolygonVertices = FALSE

Item	Definition	Value
PNF (cont):	InterfacesSupported	NameValueList "IA" = IA object reference "CA" = CA object reference "PN" = PN object reference
	AvailableAttributes	Per Table 4.1.2.1.1.3.1.1-1 plus "NITF Image Sub-File Sequence Number" (N2=01-20)
	QueryableAttributes MaxPolygonVertices	Per Table 4.1.2.1.1.3.1.1-1 long
ImageLocationSpec	<u>For each Destination:</u> -Login Name -Password -Address -Path -Host Name OR URL per "Uniform Resource Locators (URL)" RFC 1738, CERN, Xerox PARC, University of Minnesota, December, 1994	 string string string string string string

Table 4.1.2.1.1.2-1 Image Access Services Parameter Implementation Detail (TBR-004)

4.1.2.1.1.3 Catalog Access Facility

Systems shall implement the Catalog Access Facility as specified in the *Image Access Services Specification, Ver. 1.1 Ver. 1.0* in accordance with the information specified in Table 4.1.2.1.1.3-1.

Item	Definition	Value
Browse Image Specification	Vertical Size	N4="1024" or "256"
	Horizontal Size	N4="1024" or "256" Note: Vertical and Horizontal size must be the same.
	Pixel DepthResolution	N1="8"

Table 4.1.2.1.1.3-1 - Catalog Access Facility Implementation Detail (TBR-005)

4.1.2.1.1.3.1 *Standard Metadata*

USIGS Systems shall support user queries using the metadata elements specified in the *Central Imagery Office United States Imagery System Standards Profile for Imagery Archive (SPIA), Ver. 1.0.*

USIGS Systems shall support user queries of commercial satellite imagery using the additional metadata elements specified in Table 4.1.2.1.1.3.1-1.

ELEMENT	ABBR	CHAR TYPE	ELEMENTLENGTH	ELEMENT DESCRIPTION	PERMISSIBLE VALUES
SATELLITE TRACK	SATTRACK	N	8	Identifies location of an image acquired along the satellite path.	Minimum value: PATH(J) = 0001 ROW(K) = 0001 Maximum value: PATH(J) = 9999 ROW(K) = 9999 (recorded as PATH/ROW = 00010001 to 99999999

SATELLITE IDENTIFICATION	SATID	A/N	1 to 10	Unique satellite identifier	ALMA, ALMAZ1B, ERS1, ERS2, IERS1, IRS1B, LANDSAT4, LANDSAT5, MOS1, MOS1B, RADARSAT, SPOT1, SPOT2, SPOT3 The following values are TBR: LANDSAT7, NOAA6+, LEWIS, CLARK, EOSAM, EOSAM1, SEASTAR, EARTHWATCH, EYEGLASS, SPACEIM, RES21, SPOT4, SPOT5, IRS1A, IRS1B, IRSP2, IRS1C, IRS1D, ADEOS, RES2002
PREPROCESSING	PREPROC	A/N	1 to 20	Identifies the type of radiometric and geometric processing applied against the product by the commercial vendor.	LEVEL1A LEVEL1B SPOTVIEWPRECISION SPOTVIEWORTHO
LICENSE	LIC	A/N	1 to 10	Indicates the Government organizations that have legal authority to use the image in accordance with provisions specified in the contract between the purchaser and commercial vendor.	CIA = Central Intelligence Agency NIMA = National Imagery and Mapping Agency DIA = Defense Intelligence Agency DOD = Department of Defense ARMY = US Army NAVY = US Navy AF = US Air Force MARINES = US Marine Corps ACOM = US Atlantic Command CENTCOM = US Central Command EUCOM = US European Command PACOM = US Pacific Command SOUTHCOM = US Southern Command SOCOM = US Special Operations Command SPACECOM = US Space Command STRATCOM = US Strategic Command TRANSCOM = US Transportation Command IC = Intelligence Community USG = United States

					Government TITLE 50 = Public Law
IMAGE DATUM	IDATUM	A/N	1 to 10	Identifies the mathematical representation of the earth used to geocorrect/orthorecti fy the image. (Identifies the Datum associated with IGEOLO).	CLARK66 = Clarke 1866 CLARK80 = Clarke 1880 BESSEL = Bessel INT1909 = International 1909 NEWINT = New International WGS72 WGS84 GRS1980 EVEREST

Table 4.1.2.1.1.3.1-1 Additional Metadata Elements for Commercial Satellite Imagery

USIGS Systems shall support users queries of commercial satellite imagery using the modified SPIA metadata elements specified in Table 4.1.2.1.1.3.1-2.

ELEMENT	ABBR	CHAR TYPE	ELEMENT LENGTH	ELEMENT DESCRIPTION	PERMISSIBLE VALUES
IMAGE COORDINATE SYSTEM	ICORDS	A	~~1~~ **1 to 10**	Indicates the geo-referenced coordinate system **or 2-D projection** for the image. Required for NITFS.	U = UTM, G = Geodetic, C = Geocentric, N = None **and** **ACEA = Albers Conical Equal Area** **LCC = Lambert Conformal Conic** **MERC = Mercato**r **OBMERC = Oblique Mercator** **TRANSMERC = Transverse Mercator** **POLARST = Polar Stereographic** **STEREO = Stereographic** **POLYCON = Polyconic** **ORTHOGRAPH = Orthographic** **UTM = Universal Transverse Mercator** **GEOD = Geodetic** **GEOC = Geocentric** **NONE = None**

IMAGE ID	IMAGEID	A/N	1-60	A system dependent unique image identifier assigned by the collection system or producer	National, Tactical**, Civil**, **Commercial,** or Handheld Image Ids.
MEAN GSD	MEANGSD	N	7	The geometric mean of the across and along scan center-to-center distance between contiguous ground samples. Required for NITFS if ESD = Y.	000.0 to 999.9 **and 00000.0 to 99999.9** Expressed in inches, accuracy = 10%.
Note: Above modifications to MEAN GSD are required to support 1 kilometer (39370.0 inches) GSD data.					
NUMBER OF BANDS	NBANDS	N	1 **to 4**	Number of bands comprising the image.	1 to 9 **and 1 to 1000**
Note: Above modifications to NUMBER OF BANDS are required to support hyperspectral sensors.					
SENSOR NAME	SENSNAME	A/N/ Special	1-18	Identifies the name of the sensor used in capturing the image.	As defined in the 1993 Defense Airborne Reconnaissance Master Plan (TCS804720-92), section 2, pages 11 to 115 **plus the following sensor names: THEMATICMAPPER, MSS, AVHRR, EARLY BIRD1, HRV, LISSI, LISSII, LISIII, MESSR, VIIR, OPSSWIR, MCY, and HYDICE**
Note: Above modifications to SENSOR NAME are required to accommodate commercial sensors.					

Table 4.1.2.1.1.3.1-2 Modified SPIA Metadata Elements for Commercial Satellite Imagery

4.1.2.1.1.3.1.1 *Query Attribute Syntax*

Systems shall implement the Backus-Naur Form (BNF) for the boolean query syntax as defined in paragraph 6.3 of the *Image Access Services Specification, Version 1.1.* Query attributes shall be the Element name from Table 4.1.2.1.1.3.1.1-1.:

Element	Effectivity
ABPP (N2)	E02
ACCESSID (A / N64)	E01
ANGLETONORTH (N3)	E02
ASSOCTRY (A2)	E02
ASSRPT (A / N20)	E02
ATEXT (A / N255)	E02
AUTHORITY (A / N20)	E02
CAMSPECS (A / N 32)	E02
CAT (N5)	E02
CLASS (A1)	E01
CLEVEL (N2)	E02
CLOUDCVR (N3)	E02
CODEWORDS (A / N40)	E01
COMGEN (N2)	E02
CONTROL (A / N40)	E01
CTRYCD (A2)	E01
CTRYDSN (A2)	E02
CTRYPROD (A2)	E02
DATUM (A3)	E02
DOB(A / N6)	E02
DWNG (A / N6)	E02
DWNGEVT (A / N40)	E02
EQPCODE (A / N7)	E02
EQPMAN (A64)	E02
EQPNOMEN (A / N45)	E02
ESD (A1)	E01
EVENTNAME (A / N38)	E02
EVENTTYPE (A8)	E02

Element	Effectivity
FIRSTNME (A / N 28)	E02
FMCONTROL(A / N32)	E02
GENERATION(N1)	E02
ICAT(A8)	E01
ICORDS (A1)	E01
ICORDS (A10)	E02
IGEOLO (A / N60)	E01
IMAGEID (A / N40)	E01
IMAGEID (A / N60)	E02
IREP (A8)	E02
KEYWORD (A / N 255)	E02
LASTNME (A / N28)	E02
MAPID (A / N40)	E02
MEANGSD (N5)	E01
MEANGSD (N7)	E02
MIDNME (A / N28)	E02
MSNNUM (A / N7)	E01
NBANDS (N1)	E02
NCOLS (N8)	E02
NIIRS (N3)	E01
NROWS (N8)	E02
OBJVIEW (A6)	E02
OBLANGLE (N5)	E01
OBTYPE (A1)	E02
ORDBAT(A / N3)	E02
OTHERCOND (A2)	E02
PERCOVER (N3)	E02
PPNUM (A / N4)	E02
PRODCODE (A2)	E01

Element	Effectivity
PRODCRTIME (A / N14)	E01
PRODFMT(A9)	E01
PRODFSIZE (N12)	E01
PRODIDNO (A / N20)	E02
PRODSNME (A / N10)	E01
PRODTITLE (A / N50)	E01
PRODUCERCD (A 2)	E01
PRODUCERSE (A / N 6)	E02
PROJID (A2)	E02
RELEASE (A / N40)	E02
REQORG (A / N64)	E02
RPC (A1)	E01
SECTITLE (A / N40)	E02
SENSMODE (A / N12)	E02
SENSNAME (A / N18)	E02
SOURCE (A / N255)	E02
SRP (A1)	E02
STEREOID (A / N40)	E01
SUBDET (A1)	E02
SUBQUAL (A1)	E02
SUNAZ(N3)	E02
SUNEL (N3)	E02
TGTGEO (A / N15)	E01
TGTID (A / N15)	E01
TGTNAME (A / N38)	E01
TGTUTM (A / N16)	E02
TIMECOLL (A / N14)	E01
TPP (N3)	E02
SATTRACK (N8)	E02

Element	Effectivity
SATID (A / N10)	E02
PREPROC (A / N20)	E02
LIC (A / N10)	E02
IDATUM (A / N10)	E02

Table 4.1.2.1.1.3.1.1-1 CAF Query Attributes (TBR-009)

A mapping of TFRD support data elements to NITFS Support Data Extensions (SDE) can be found in *National Image Transmission Format Implementation Requirements Document (NITFIRD)*, S2035A. A mapping of SPIA data elements to NITFS Support Data Extensions can be found in *Central Imagery Office United States Imagery System Standards Profile for Imagery Archive (SPIA), Ver. 1.0.* Note that not all SDE fields are queryable as defined in the SPIA.

4.1.2.1.1.4 Profile and Notification Facility

Systems shall implement the Profile and Notification Facility as specified in the *Image Access Services Specification, Ver. 1.1* in accordance with the information specified in Table 4.1.2.1.1.4-1.

Item	Definition	Value
email_address	the email address for the notifications	string
results		same as defined by the CA interface

Table 4.1.2.1.1.4-1 - Profile and Notification Facility Implementation Detail (TBR-010)

4.1.3 *Network Access Interfaces*

4.1.3.1 Connection Element

Systems shall conform to the Connection Element specification contained in the *CIO Standards Profile for Image Distribution (SPID)* (CIO ASD SID05940000), Version 1 as defined in paragraph 3.2.1.1 with the following addition:

Asynchronous Transfer Mode (ATM) as defined by (TBD-022) may be used in addition to or instead of Fiber Distributed Data Interface (FDDI)

4.1.3.2 Image Transfer Element

Systems shall conform to the Image Transfer Element specification contained in the *CIO Standards Profile for Image Distribution (SPID)* (CIO ASD SID05940000), Version 1 as defined in paragraph 3.2.1.2.

4.1.4 ***File Format Element***

Systems shall conform to the File Format Element specification contained in the *CIO Standards Profile for Image Distribution (SPID)* (CIO ASD SID05940000), Version 1 as defined in paragraph 3.2.1.3 with the following additions:

1. Systems shall generate and / or receive imagery and image products in the Tape Format Requirements Document (TFRD) format per Table 4.1.4-1.
2. Systems shall generate and / or receive imagery and image products compressed using the JPEG (8-bit), JPEG (12-bit), 4.3 DPCM, 2.3 DCT, and 1.3 DCT algorithms per Table 4.1.4-1.
3. Systems shall generate and / or receive imagery and image products in TIFF 6.0 format per Table 4.1.4-1.
4. Systems shall generate and / or receive imagery and image products in Sun Raster format per Table 4.1.4-1.
5. Systems shall generate and / or receive imagery and image products in Graphic Interchange Format (GIF) format per Table 4.1.4-1.
6. Systems shall generate and / or receive imagery and image products in Postscript format per Table 4.1.4-1.
7. Systems shall generate and / or receive imagery and image products in Motion Picture Experts Group (MPEG) -2 format per Table 4.1.4-1.

	IDEX		**NIMA Library**		**DE**		**CIP**		**Expl. Sys.**		**Other Clients**	
	G	**R**	**G**	**R**	**G**	**R**	**G**	**R**	**G**	**R**	**G**	**R**

	IDEX		NIMA Library		DE		CIP		Expl. Sys.		Other Clients	
	G	**R**	**G**	**R**	**G**	**R**	**G**	**R**	**G**	**R**	**G**	**R**
NITF 1.1				X						O		O
NITF 2.0:												
Uncomp.	X	X	X	X	X	X	X	X	X	X	X	X
JPEG-8 bit	X	X	X	X		X	X	X	X	X	X	X
JPEG-12 bit	X	X	X	X		X	X	X	X	X	O	O
TFRD:												
4.3 DPCM		X		X		X				O		O
2.3 DCT			X	X		X				O		O
1.3 DCT			X	X		X				O		O
GIF				X					O	O	O	O
Postscript				X					O	O	O	O
MPEG-2				X					O	O	O	O
TIFF 6.0			X	X		O			O	O	O	O
Sun Raster			X	X		O			O	O	O	O

G= Generate or produce a file from a different format

R= Receive, process, and store file

X= Required capability

O= Optional capability (may not be present at all system locations based on local requirements)

Table 4.1.4-1 - Format and Compression Requirements (TBR-006)

4.1.4.1 Format and Compression Conversion

4.1.4.1.1 *National Data*

File format and/or compression conversion provided by USIGS Libraries for National data shall be limited as defined in Table 4.1.4.1.1-1.

TO: / **FROM**:	TFRD 1.3	TFRD 2.3	TFRD 4.3	NITF Unc	NITF 12-bit JPEG (DQ)	NITF 12-bit JPEG (VL)	NITF 8-bit JPEG	TIFF 6.0	GIF	Post-script	Sun Raster
TFRD 1.3		No	No	Yes	Yes	No	No	No	No	No	No

TO: / **FROM**:	TFRD 1.3	TFRD 2.3	TFRD 4.3	NITF Unc	NITF 12-bit JPEG (DQ)	NITF 12-bit JPEG (VL)	NITF 8-bit JPEG	TIFF 6.0	GIF	Post-script	Sun Raster
TFRD 2.3	No		No	Yes	Yes	No	No	No	No	No	No
TFRD 4.3	Yes	Yes		Yes	Yes	Yes	No	No	No	No	No
NITF Unc	No	No	No		Yes	Yes	No	No	No	No	No
NITF 12-bit JPEG (DQ)	No	No	No	Yes		No	No	No	No	No	No
NITF 12-bit JPEG (VL)	No	No	No	Yes	Yes		No	No	No	No	No
NITF 8-bit JPEG	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA
TIFF 6.0	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
GIF	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA
Postscript	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
Sun Raster	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Note: DQ=Dissemination Quality (~1.3 bpp) VL=Visually Lossless Quality (~4.3 bpp)											

Table 4.1.4.1.1-1 National Data Conversion Requirements (TBR-011)

4.1.4.1.2 *Tactical Data*

File format and/or compression conversion provided by USIGS Libraries for Tactical data shall be limited as defined in Table 4.1.4.1.1-2.

TO: / **FROM**:	TFRD 1.3	TFRD 2.3	TFRD 4.3	NITF Unc	NITF 12-bit JPEG (DQ)	NITF 12-bit JPEG (VL)	NITF 8-bit JPEG	TIFF 6.0	GIF	Post-script	Sun Raster
TFRD 1.3		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TFRD 2.3	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
TFRD 4.3	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA

TO: / **FROM**:	TFRD 1.3	TFRD 2.3	TFRD 4.3	NITF Unc	NITF 12-bit JPEG (DQ)	NITF 12-bit JPEG (VL)	NITF 8-bit JPEG	TIFF 6.0	GIF	Post-script	Sun Raster
NITF Unc	No	No	No		No	Yes	No	No	No	No	No
NITF 12-bit JPEG (DQ)	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA
NITF 12-bit JPEG (VL)	No	No	No	Yes	No		No	No	No	No	No
NITF 8-bit JPEG	No	No	No	Yes	No	No		No	No	No	No
TIFF 6.0	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
GIF	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA
Postscript	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
Sun Raster	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

Note: DQ=Dissemination Quality (~1.3 bpp) VL=Visually Lossless Quality (~4.3 bpp)

Table 4.1.4.1.2-1 Tactical Data Conversion Requirements (TBR-012)

4.1.4.1.3 *Image Products*

File format and/or compression conversion provided by USIGS Libraries for Image Product data shall be limited as defined in Table 4.1.4.1.1-3.

TO: / **FROM**:	TFRD 1.3	TFRD 2.3	TFRD 4.3	NITF Unc	NITF 12-bit JPEG (DQ)	NITF 12-bit JPEG (VL)	NITF 8-bit JPEG	TIFF 6.0	GIF	Post-script	Sun Raster
TFRD 1.3		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TFRD 2.3	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
TFRD 4.3	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
NITF Unc	No	No	No		Yes	Yes	Yes	No	No	No	No

TO: / **FROM**:	TFRD 1.3	TFRD 2.3	TFRD 4.3	NITF Unc	NITF 12-bit JPEG (DQ)	NITF 12-bit JPEG (VL)	NITF 8-bit JPEG	TIFF 6.0	GIF	Post-script	Sun Raster
NITF 12-bit JPEG (DQ)	No	No	No	Yes		No	Yes	No	No	No	No
NITF 12-bit JPEG (VL)	No	No	No	Yes	Yes		Yes	No	No	No	No
NITF 8-bit JPEG	No	No	No	Yes	No	No		No	No	No	No
TIFF 6.0	No	No	No	Yes	No	No	Yes		No	No	No
GIF	No	No	No	Yes	No	No	Yes	No		No	No
Postscript	No	No	No	Yes	No	No	Yes	No	No		No
Sun Raster	No	No	No	Yes	No	No	Yes	No	No	No	

Note: DQ=Dissemination Quality (~1.3 bpp) VL=Visually Lossless Quality (~4.3 bpp)

Table 4.1.4.1.3-1 Image Products Conversion Requirements (TBR-013)

4.1.4.2 National Image Transmission Format Standards (NITFS) Files

The following requirements shall apply to all NITF 2.0 files generated by USIGS Systems.

4.1.4.2.1 *NITF Header*

All USIGS Systems shall populate the NITF 2.0 header fields as specified in Table A-I of the *CIO Standard Profile for Image Distribution (SPID).* Specific implementation of NITF 2.0 header fields shall be as specified in Appendix 7.1-Table 7.1-1.

4.1.4.2.2 *Image Data Type*

4.1.4.2.2.1 Image Sub-Header

All USIGS Systems shall populate the NITF 2.0 image sub-header fields as specified in Table A-II of the *CIO Standard Profile for Image Distribution (SPID).*

Specific implementation of NITF 2.0 header fields shall be constrained as specified in Appendix 7.2-Table 7.2-1.

4.1.4.2.2.2 Image Data

4.1.4.2.2.2.1 *Image Data Compression*

Systems generating image files in NITF 2.0 format shall provide the image data in either uncompressed format or compress the image data using one of the following algorithms:

1. Eight-bit image data shall be compressed using JPEG DCT as specified in *Joint Photographic Experts Group for the National Image Transmission Format (NITFS)*, MIL-STD-188-198A.
2. Image data greater than eight-bits shall be compressed using 12-bit JPEG DCT as specified in paragraph 30.3 of the *National Image Transmission Format Implementation Requirements Document (NITFIRD)*, S2035A, TCS055B-BA00039-95.

4.1.4.2.3 *Symbol Data Type*

4.1.4.2.3.1 Symbol Sub-Header

All USIGS Systems shall populate the NITF 2.0 symbol sub-header fields as specified in Table VI of *the National Imagery Transmission Format-Version 2.0 (MIL-STD-2500A).* Specific implementation of NITF 2.0 symbol sub-header fields shall be constrained as specified in Appendix 7.3-Table 7.3-1.

4.1.4.2.3.2 Symbol Data

All annotation requirements (including alphanumeric labels) shall be satisfied by USIGS Systems in accordance with *the National Imagery Transmission Format-Version 2.0 (MIL-STD-2500A)*, paragraph 5.6.

4.1.4.2.4 *Text Data Type*

4.1.4.2.4.1 Text Sub-Header

USIGS Systems shall populate the NITF 2.0 text sub-header fields as specified in Table VI of *the National Imagery Transmission Format-Version 2.0 (MIL-STD-2500A).* Specific implementation of NITF 2.0 text sub-header fields shall be constrained as specified in Appendix 7.4-Table 7.4-1.

4.1.4.2.4.2 Text Data

USIGS Systems text data sub-files shall be created in accordance with the *National Imagery Transmission Format-Version 2.0 (MIL-STD-2500A),* paragraph 5.8.

4.1.4.2.5 *Data Extensions*

4.1.4.2.5.1 Support Data Extensions for National Data

USIGS Systems shall store exploitation support data applicable to National image data in NITFS Controlled Data Extensions as documented in *Support Data Extensions (version 1.1) for the NITF 2.0,* TCS-037-028/94, 10 June 1994.

4.1.4.2.5.2 Support Data Extensions for Tactical Data-SAR

USIGS Systems shall store exploitation support data applicable to Tactical SAR image data in NITFS Controlled Data Extensions as documented in *Airborne Synthetic Aperture Radar (SAR) Support Data Extensions for the National Imagery Transmission Format (Version 2.0) of the National Imagery Transmission Fromat Standards, Version 0.9.*

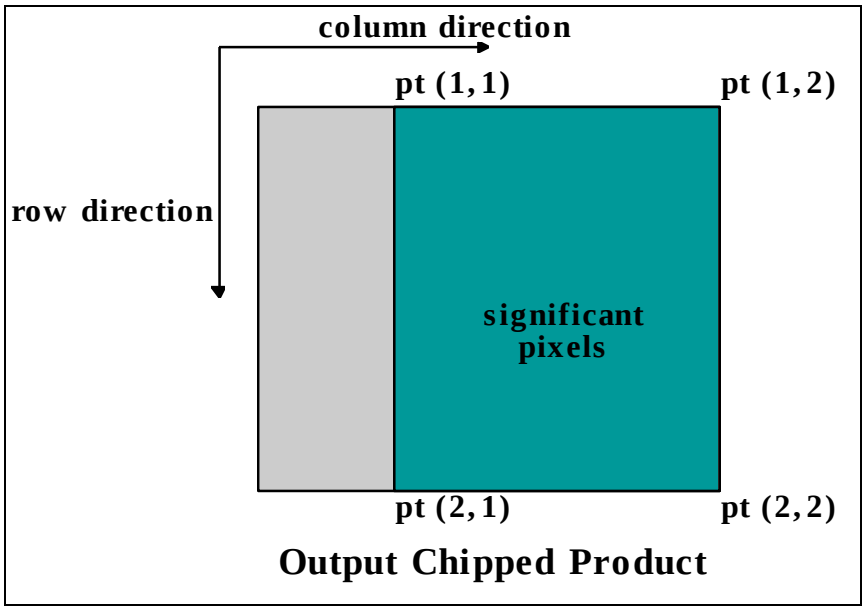
4.1.4.2.5.3 Support Data Extensions for Tactical Data-EO, IR, and MS

USIGS Systems shall store exploitation support data applicable to Tactical EO, IR, or MS image data in NITFS Registered Data Extensions as documented in *Visible, Infrared, and Multispectral Airborne Sensor Support Data Extensions (SDE) for the National Imagery Transmission Format (Version 2.0) of the National Imagery Transmission Format Standards (Draft), 20 November 1996.*

4.1.4.2.5.4 Support Data Extension for National Intel Sub-images (chips)

USIGS Systems shall provide the ICHIPA controlled tag to provide the data needed to mensurate and to calculate geopositions of features on National Intel imagery products (chips).

This tag deals only with nondewarped imagery (i.e., linear). It provides both the output product row and column data for the image as well as those data points referenced back to values for the original full Intel image. For this tag, the original line and sample shall be provided at the four corners of the significant image data.



The tagged record fields for the ICHIPA extension are specified in Tables 4.1.4.2.5.2-1, 4.1.4.2.5.2-2, and 4.1.4.2.5.2-3.

FIELD	NAME	SIZE	VALUE RANGE	TYPE
CETAG	Unique extension type identifier	6	ICHIPA	R
CEL	Length of CEDATA field	5	00208	R
CEDATA	User-defined data	fix	See Table 2 (TBR)	R

Table 4.1.4.2.5.2-1 ICHIPA tagged record sub-header fields

FIELD	NAME	SIZE	VALUE RANGE	TYPE
XFRM_FLAG	Non-linear Transformation Flag	2	Numeric 00 (nondewarped, data provided), 01 (no data provided)	R

SCALE_ FACTOR	Scale Factor Relative to R0 (original full Intel image resolution)	10	Numeric (typically reciprocal of display magnification) xxxx.xxxxx	R
ANAMRP H_CORR	Anamorphic Correction Indicator	2	Numeric (00 or 01)	R
SCANBLK _NUM	Scan Block Number (scan block index)	2	00-99 00 if not applicable	R
OP_ ROW_11	Output product row number component of grid point index (1,1) for significant data	12	Numeric xxxxxxxx.yyy (typically 00000000.500)	R
OP_ COL_11	Output product column number component of grid point index (1,1) for significant data	12	Numeric xxxxxxxx.yyy (typically 00000000.500)	R
OP_ ROW_12	Output product row number component of grid point index (1,2) for significant data	12	Numeric xxxxxxxx.yyy	R
OP_ COL_12	Output product column number component of grid point index (1,2) for significant data	12	Numeric xxxxxxxx.yyy	R
OP_ ROW_21	Output product row number component of grid point index (2,1) for significant data	12	Numeric xxxxxxxx.yyy	R
OP_ COL_21	Output product column number component of grid point index (2,1) for significant data	12	Numeric xxxxxxxx.yyy	R
OP_ ROW_22	Output product row number component of grid point index (2,2) for significant data	12	Numeric xxxxxxxx.yyy	R
OP_ COL_22	Output product column number component of grid point index (2,2) for significant data	12	Numeric xxxxxxxx.yyy	R
FI_ ROW_11	Grid point (1,1), row number in full Intel image coordinate system	12	Numeric xxxxxxxx.yyy	R
FI_ COL_11	Grid point (1,1), column number in full Intel image coordinate system	12	Numeric xxxxxxxx.yyy	R
FI_ ROW_12	Grid point(1,2), row number in full Intel image coordinate system	12	Numeric xxxxxxxx.yyy	R

FI_ COL_12	Grid point(1,2), column number in full Intel image coordinate system	12	Numeric xxxxxxxx.yyy	R
FI_ ROW_21	Grid point (2,1), row number in full Intel image coordinate system	12	Numeric xxxxxxxx.yyy	R
FI_ COL_21	Grid point (2,1), column number in full Intel image coordinate system	12	Numeric xxxxxxxx.yyy	R
FI_ ROW_22	Grid point (2,2), row number in full Intel image coordinate system	12	Numeric xxxxxxxx.yyy	R
FI_ COL_22	Grid point (2,2), column number in full Intel image coordinate system	12	Numeric xxxxxxxx.yyy	R

Note:
- Row and column indexing, NITF nomenclature, corresponds to line and sample indexing in original product nomenclature.
- If XFRM_FLAG is 01, then remaining values will be zero fill.

Table 4.1.4.2.5.2-2 ICHIPA User Defined field format

FIELD	VALUE DEFINITIONS AND CONSTRAINTS
XFRM_FLAG	Non-linear Transformation Flag. If image is nondewarped, field is 00. For all others, flag is 01 with zero fill in the remaining fields.
SCALE_FACTOR	Scale factor relative to the full Intel image resolution R0. This provides a mechanism to reference back to the full Intel image if product is not at R0. To determine product RRDS value: if 0001.00000 then 00; 0002.00000 then 01; 0004.00000 then 02; 0008.00000 then 03; 0016.00000 then 04; 0032.00000 then 05; 0064.00000 then 06; 0128.00000 then 07
ANAMRPH_CORR	If no anamorphic correction, 00; otherwise 01
SCANBLK_NUM	Scan block number from which the product was chipped if applicable; otherwise 00
OP_ROW_11	Output product row number component of grid point index (1,1) for significant data. Typically 00000000.500
OP_COL_11	Output product column number component of grid point index (1,1) for significant data. Typically 00000000.500

OP_ROW_12	Output product row number component of grid point index (1,2) for significant data.
OP_COL_12	Output product column number component of grid point index (1,2) for significant data.
OP_ROW_21	Output product row number component of grid point index (2,1) for significant data.
OP_COL_21	Output product column number component of grid point index (2,1) for significant data.
OP_ROW_22	Output product row number component of grid point index (2,2) for significant data.
OP_COL_22	Output product column number component of grid point index (2,2) for significant data.
FI_ROW_11	Grid point (1,1), row number in full Intel image coordinate system.
FI_COL_11	Grid point (1,1), column number in full Intel image coordinate system.
FI_ROW_12	Grid point (1,2), row number in full Intel image coordinate system.
FI_COL_12	Grid point (1,2), column number in full Intel image coordinate system.
FI_ROW_21	Grid point (2,1), row number in full Intel image coordinate system.
FI_COL_21	Grid point (2,1), column number in full Intel image coordinate system.
FI_ROW_22	Grid point (2,2), row number in full Intel image coordinate system.
FI_COL_22	Grid point (2,2), column number in full Intel image coordinate system.

Table 4.1.4.2.5.2-3 ICHIPA User Defined field definitions

4.1.4.2.5.5 Profile for Imagery Archive Extensions

USIGS Systems shall store and process metadata applicable to the image product in NITFS Controlled Data Extensions as documented in *National Image Transmission Format Standard Profile for Imagery Archive Extensions (NITFS PIAE).*

4.1.4.2.5.6 Compression Extensions

USIGS Systems compressing image data with the 12-bit JPEG algorithm shall include the Controlled Data Extensions as documented in Appendix 10.2 of the *National Image Transmission Format Implementation Requirements Document (NITFIRD)*, S2035A, TCS055B-BA00039-95.

4.1.4.3 Tape Format Requirements Document (TFRD) Files

4.1.4.3.1 *Image Data*

USIGS Systems generating image files in TFRD format shall format the image data as specified in paragraph 3.1.4 of the *Tape Format Requirements Document*, S2025P, TCS-055B-BA02767-93.

4.1.4.3.1.1 Image Data Compression

USIGS Systems generating image files in TFRD format shall compress the image data using one of the following algorithms:

1. Discrete Cosine Transform (DCT) as specified in Appendix 10.1 or 10.9 of the *Tape Format Requirements Document*, S2025P, TCS-055B-BA02767-93.
2. Differential Pulse Code Modulation (DPCM) as specified in Appendix 10.3 of the *Tape Format Requirements Document*, S2025P, TCS-055B-BA02767-93.

4.1.4.3.2 *Metadata*

USIGS Systems shall include the available metadata with imagery and image products.

For TFRD files, USIGS Systems shall transfer metadata in the Support Block as defined in paragraph 3.1.3 of the *Tape Format Requirements Document (TFRD),* S2025P, TCS-055B-BA02767-93.

4.1.4.4 Tagged Image File Format Files

4.1.4.4.1 *Image Data*

USIGS Systems shall format the image data within TIFF files in accordance with *TIFF*, Revision 6.0, Final-June 3, 1992.

4.1.4.4.2 *Metadata*

USIGS Systems shall include the available metadata with imagery and image products.

USIGS Systems shall provide metadata associated with TIFF formatted files using the IPL Data File defined in paragraph 50.8 of the *Interface Control Document for IPL 1.0*, 19470789B.

The IPL Data File shall be named in accordance with paragraph 30.1.1 of the *Interface Control Document for IPL 1.0*, 1947089B,.

4.1.4.5 Sun Raster Files

4.1.4.5.1 *Image Data*

USIGS Systems shall format the image data within Sun Raster files in accordance with (TBD-024).

4.1.4.5.2 *Metadata*

USIGS Systems shall include the available metadata with imagery and image products.

USIGS Systems shall provide metadata associated with Sun Raster formatted files using the IPL Data File defined in paragraph 50.8 of the *Interface Control Document for IPL 1.0*, 1947089B.

The IPL Data File shall be named in accordance with paragraph 30.1.1 of the *Interface Control Document for IPL 1.0*, 1947089B,.

4.1.4.6 Graphic Interchange Format (GIF) Files

4.1.4.6.1 *Image Data*

USIGS Systems shall format the image data within GIF files in accordance with (TBD-033).

4.1.4.6.2 *Metadata*

USIGS Systems shall include the available metadata with imagery and image products.

USIGS Systems shall provide metadata associated with GIF formatted files using the IPL Data File defined in paragraph 50.8 of the *Interface Control Document for IPL 1.0*, 1947089B.

The IPL Data File shall be named in accordance with paragraph 30.1.1 of the *Interface Control Document for IPL 1.0*, 1947089B.

4.1.4.7 Postscript Files

4.1.4.7.1 *Image Data*

USIGS Systems shall format the image data within Postscript files in accordance with (TBD-034).

4.1.4.7.2 *Metadata*

USIGS Systems shall include the available metadata with imagery and image products.

USIGS Systems shall provide metadata associated with Postscript formatted files using the IPL Data File defined in paragraph 50.8 of the *Interface Control Document for IPL 1.0*, 1947089B.

The IPL Data File shall be named in accordance with paragraph 30.1.1 of the *Interface Control Document for IPL 1.0*, 1947089B.

4.1.4.8 Motion Picture Experts Group - 2 (MPEG-2) Files

4.1.4.8.1 *Video Data*

USIGS Systems shall format the video data within MPEG-2 files in accordance *with Motion Picture Experts Group (MPEG) Document-2, (ISO/IEL 13818)*

4.1.4.8.2 *Metadata*

(TBD-036)

4.2 Exploitation Support Interoperability Requirements (TBD-027)

5 *Verification*

5.1 Verification Methods

The implementation of the requirements identified in Section 4 of this document shall be verified as defined in the following paragraphs. The methods of verifying conformance to the requirements of Section 4 are certification, testing, and intersystem demonstration.

5.2 Interoperability Certification

5.2.1 *NITFS Certification*

NITFS Certification plays an important role within the USIGS. One of the fundamental objectives of A3I is to deliver systems that are truly interoperable. The NITFS Certification program is designed to greatly improve the interoperability of systems exchanging image files formatted in accordance with the NITFS. Achieving NITFS Certification to the appropriate compliance level(s) prior to integration at one or more of the USIGS sites will reduce the risk that a USIGS System will be unable to successfully exchange image data with other USIGS components.

5.2.1.1 USIGS NITFS Certification Requirements

NITFS Certification requirements are divided into generate (or pack) requirements and receive (or unpack) requirements. Systems that generate NITF 2.0 files do not need to implement all of the NITFS as long as they do not implement anything that is not allowed by the NITFS. Systems that receive and process NITF 2.0 files must implement all NITFS functionality (within the bounds of one or more NITFS-defined certification levels) to ensure total interoperability.

Implementors should recognize that USIGS systems may perform other roles within site architectures that may require additional compliance certification.

All NITFS certification shall be performed by the JITC in accordance with JIEO Circular 9008, 30 June 1993.

5.3 Testing

The test program will enable validation testing of candidate server and client applications in a testbed environment to validate the interface specification and to demonstrate interoperability of multiple clients with multiple or individual servers prior to deployment in an operational environment.

5.3.1 *Reference Implementation Development and Validation Testing*

*Reference Implementation*s of the interfaces described in this document will be developed by the Government as part of the A3I Program. These Reference Implementations will be made accessible in a testbed environment where other A3I and client developers can install their systems and validate their implementations. Any anomalies or issues resulting from this validation testing will be fed back into the CIIP and appropriate interface specifications. This will demonstrate the adequacy of the interface specification and any changes resulting from it will be processed via RFCs.

5.4 Intersystem Demonstrations

The National Imagery and Mapping Agency will conduct periodic demonstrations of USIGS functionality during the development phases. The success of these demonstrations will be determined by the compliance of the USIGS Systems to the requirements contained in Section 4 of this document.

The description of the USIGS demonstrations is contained in *the NIMA Test and Evaluation Master Plan (TEMP) for the Accelerated Architecture Acquisition Initiative (A3I), (CIO-2039)*

6 *Notes*

6.1 Acronyms

A3I	Accelerated Architecture Acquisition Initiative
API	Application Program Interface
CAF	Catalog Access Facility
CAWS	Commercial Analyst Workstation
CGM	Computer Graphics Metafile
CIGSS	Common Imagery Ground Surface System
CIIF	Common Imagery Interoperability Facilities
CIIP	Common Imagery Interoperability Profile
CIL	Command Image Library
CIO	Central Imagery Office (now part of NIMA)
CIP	Common Imagery Processor
CORBA	Common Object Request Broker Architecture
COTS	Commercial Off-the-Shelf
DARO	Defense Airborne Reconnaissance Office
DCT	Discrete Cosine Transform
DE	Dissemination Element
DPCM	Differential Pulse Code Modulation
EPS	Enhanced Processing System
ESD	Exploitation Support Data
ESS	Exploitation Support System
FTP	File Transfer Protocol
GFE	Government Furnished Equipment
GIF	Graphic Interchange Format
GOTS	Government Off-the-Shelf (GOTS)
HDBS	Host Data Base System
HTTP	Hypertext Transfer Protocol
IAF	Image Access Facility
IDEX	Image Data Exploitation System
IDF	Image Dissemination Facility
IDL	Interface Definition language

IESS	Image Exploitation Support System
IFS	Image File Server
IIOP	Internet Inter-ORB Protocol
IMF	Image Mensuration Facility
IP	Internet Protocol
IPA	Image Product Archive
IPL	Image Product Library
IS&R	Image Storage and Retrieval
ISMC	Imagery Standards Management Committee
ISO	International Standards Organization
JPEG	Joint Photographic Experts Group
JRD	Joint Requirements Document
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPEG-2	Motion Picture Experts Group-2
NCCB	NIMA Configuration Control Board
NES	National Exploitation System
NIL	National Image Library
NIMA	National Imagery and Mapping Agency
NITF	National Image Transmission Format
NITFS	National Image Transmission Format Standards
OMG	Object Management Group
ORB	Object Request Broker
PIAE	Profile for Imagery Archives Extensions
PNF	Profile and Notification Facility
SAR	Synthetic Aperture Radar
SDE	Support Data Extensions
SPIA	Standards Profile for Imagery Archive
SPID	Standards Profile for Image Distribution
SUCCB	NIMA ST/USIGS Configuration Control Board
TFRD	Tape Formats Requirements Document
TIFF	Tagged Image File Format

TBD	To Be Determined
TBR	To Be Resolved
TMWS	Target Materials Workstation
URL	Uniform Resource Locator
USIS	United States Imagery System
USIGS	United States Imagery and Geospatial System

7 Appendices

7.1 NITF 2.0 Image Header Format

Table 7.1-1 contains additional implementation details supplementing information contained in the *CIO Standard Profile for Image Distribution*, Table A-I.

Field	Value	Comment
OSTAID	(Generated)	DEnn, NIL, CILnn, IPLnnn, CIPnn where nn=site#. Others per implementing PO / User organization requirements
FSCLAS	(Generated)	Highest classification for all information contained within the NITF file.
FSCODE	(Generated)	xxxxbyyyyyyy, where xxxx is security codeword; b is ASCII space; and yyyyyyy is control channel caveat
FSCTLH	(Generated)	wwwwwwbz where wwwwww is dissemination restriction word; b is ASCII space; and z is security indicator (SECIND)
FSREL	(Generated)	Per implementing PO / User organization requirements
FSCTLN	(Generated)	Per implementing PO / User organization requirements
FSDWNG	(Generated)	Per implementing PO / User organization requirements
FSDEVT	(Generated)	Per implementing PO / User organization requirements
FSCOP	00000	Not Used
FSCPYS	00000	Not Used

Field	Value	Comment
ONAME	(Generated)	Per implementing PO / User organization requirements
OPHONE	Spaces	Not Used
NUMDES	000	Not Used
NUMRES	000	Not Used
UDHDL	00000	Not Used
XHDL	(Generated)	Lenngth of all incorporated controlled tag extensions plus 3

Table 7.1-1NITF Image Header Implementation for NIMA Libraries

7.2 NITF 2.0 Image Sub-Header Format

Table 7.2-1 contains additional implementation details supplementing information contained in the *CIO Standard Profile for Image Distribution*, Table A-II.

Field	Value	Comment
IID	0000000000	Actual Image ID is in ITITLE
ITITLE	(Generated)	Original 40 character IMP ID or 24 character image ID followed by spaces
ISCLAS	(Generated)	classification for image data in this subfile
ISCODE	(Generated)	xxxxbyyyyyyy, where xxxx is security codeword; b is ASCII space; and yyyyyyy is control channel caveat
ISCTLH	(Generated)	wwwwwwbz where wwwwww is dissemination restriction word; b is ASCII space; and z is security indicator (SECIND)
ISREL	(Generated)	Per implementing PO / User organization requirements

Field	Value	Comment
ISCTLN	(Generated)	Per implementing PO / User organization requirements
ISDWNG	(Generated)	Per implementing PO / User organization requirements
ISDEVT	(Generated)	Per implementing PO / User organization requirements
ISOURCE	(Generated)	Use appropriate classification and source acronyms
PVTYPE	INT	Integer format
IREP	(Generated)	MONO for monochrome; MULTI for multi-band imagery
PJUST	R	Pixels are right justified
IC	NC or C3	NC for uncompressed; C3 for JPEG compressed
COMRAT	(Generated)	Omit if IC=NC; Valid rate if IC=C3
NBPP	8 or 16	8 for 8 bit images; 16 for 9-16 bit images
IDLVL	001	
IALVL	000	
ILOC	0000000000	First pixel is not offset
IMAG	(Generated)	1.0 for full resolution (R0); /2 for half resolution (R1) through /128 for R7
UDIDL	00000	No user defined data
IXSHDL	(Generated)	Length of all incorporated controlled extensions plus 3
IXSOFL	000	No overflow required

Table 7.2-1 - NITF Image Sub-Header Implementation for NIMA Libraries

7.3 NITF 2.0 Symbol Sub-Header Format

Table 7.3-1 contains implementation details supplementing information contained in the *National Imagery Transmission Format-Version 2.0 (MIL-STD-2500).*, Table VI.

Field	Description	Size	Value Range	Type	Value	Comment
SY	File Part Type	2	SY	R	SY	NITF 2.0 reqmts(Note A)
SID	Symbol ID	10	Alphanumeric	R	(Generated)	Note A
SNAME	Symbol Name	20	Alphanumeric	O	(Generated)	Note A
SSCLAS	Symbol Security Classification	1	T,S,C,R, or U	R	(Generated)	Based upon classification of Symbol or per system high classification
SSCODE	Symbol Codewords	40	Alphanumeric	O	(Generated)	xxxxbyyyyyyy, where xxxx is security codeword; and b is an ASCII Space; and YYYYYYY is control channel caveat based on classification of Symbol or per system high classification
SSCTLH	Symbol Control and Handling	40	Alphanumeric	O	(Generated)	WWWWWWbZ, where WWWWWW is the Dissemination Restriction word (e.g. NOFORN, 6 ASCII Spaces); and b is an ASCII Space; and Z is the security indicator value, if any or space
SSREL	Symbol Releasing Instructions	40	Alphanumeric	O	(Generated)	Note C
SSCAUT	Symbol Classification Authority	20	Alphanumeric	O	DoD S-5210.51 (M-1)	Note C

Field	Description	Size	Value Range	Type	Value	Comment
SSCTLN	Symbol Security Control Number	20	Alphanumeric	O	(Spaces)	Note C
SSDWNG	Symbol Security Downgrade	6	Alphanumeric	O	(Generated)	Note C
SSDEVT	Symbol Downgrading Event	40	Alphanumeric	C	(Omit)	Note A
ENCRYP	Encryption	1	0=Not Encrypted 1=Encrypted	R	0	Note A
STYPE	Symbol Type	1	B for bit-mapped; C for CGM; O for Object	R	(Generated)	CGM recommended for all symbol and label implementations
NLIPS	Number of lines Per Symbol	4	0-9999	R	0	Note A
NPIXPL	Number of Pixels per line	4	0-9999	R	0	Note A
NWDTH	Line Width	4	0-9999	R	0	Note A
NBPP	Number of bits Per Pixel	1	0-8	R	0	Note A
SDLVL	Display Level	3	1-999	R	(Generated)	(Note A)
SALVL	Attachment Level	3	0-998	R	(Generated)	(Note A)
SLOC	Symbol Location	10	rrrrrccccc	R	(Generated)	(Note A)
SLOC2	Second Symbol Location	10	rrrrrccccc	O	(Generated)	(Note A)
SCOLOR	Symbol Color	1	Note A	R	(Space)	(Note A)
SNUM	Symbol Number	6	Note A, table IV	O	000000	(Note A)
SROT	Symbol Rotation	3	0-359	R	000	(Note A)
NELUT	Number of LUT Entries	3	0-256	R	000	(Note A)

Field	Description	Size	Value Range	Type	Value	Comment
DLUT	Symbol LUT Data	2	Pixel values in Order	C	(omit)	(Note A)
SXSHDL	Extended Subheader Data Length	5	0-08833	R	(Generated)	(Note A)
SXSOFL	Extended Subheader Overflow	3	0-999	C	(Gen / omit)	(Note A)
SXSHD	Extended Subheader Data	*	Controlled Tagged Record Extensions	C	(Gen / omit)	(Note A)

Table 7.3-1 NITF Symbol Sub-Header Implementation for NIMA Libraries

7.4 NITF 2.0 Text Sub-Header Format

Table 7.4-1 contains implementation details supplementing information contained in the *National Imagery Transmission Format-Version 2.0 (MIL-STD-2500).*, Table XIII.

Field	Description	Size	Value Range	Type	Value	Comment
TE	File Part Type	2	TE	R	TE	NITF 2.0 reqmts(Note A)
TEXTID	Text ID	10	Alphanumeric	R	(Generated)	Note A
TXTDT	Text Date & Time	14	DDHHMMSSZMONYY	R	(Generated)	The time (zulu) of the origination of the text where DD is the day of the month (01-31), HH is the hour (00-23), mm is the minute (00-59), the character Z, MON is the first three characters of the month, and YY is the last two digits of the year.
TXTITL	Text Title	80	Alphanumeric	O	(Generated)	Note A

Field	Description	Size	Value Range	Type	Value	Comment
TSCLAS	Text Security Classification	1	T,S,C,R, or U	R	(Generated)	Based upon classification of Text or per system high classification
TSCODE	Text Codewords	40	Alphanumeric	O	(Generated)	xxxxbyyyyyyy, where xxxx is security codeword; and b is an ASCII Space; and YYYYYYY is control channel caveat based on classification of Symbol or per system high classification
TSCTLH	Text Control and Handling	40	Alphanumeric	O	(Generated)	WWWWWWbZ, where WWWWWW is the Dissemination Restriction word (e.g. NOFORN, 6 ASCII Spaces); and b is an ASCII Space; and Z is the security indicator value, if any or space
TSREL	Text Releasing Instructions	40	Alphanumeric	O	(Generated)	Note C
TSCAUT	Text Classification Authority	20	Alphanumeric	O	DoD S-5210.51 (M-1)	Note C
TSCTLN	Text Security Control Number	20	Alphanumeric	O	(Generated)	Note C
TSDWNG	Text Security Downgrade	6	Alphanumeric	O	(Generated)	Consistent with OADR / Note C
TSDEVT	Text Downgrading Event	40	Alphanumeric	C	Generated)	Note A
ENCRYP	Encryption	1	0=Not Encrypted 1=Encrypted	R	0	Note A
TXTFMT	Text Format	3	JTC, STA, OTH	R	STA	ASCII to be used for all text

Field	Description	Size	Value Range	Type	Value	Comment
TXSHDL	Extended Subheader Data Length	5	0-09677	R	(Generated)	Note A
TXSOFL	Extended Subheader Overflow	3	0-999	C	(Gen / omit)	Note A
TXSHD	Extended Subheader Data	*	Controlled Tagged Record Extensions	C	(Gen / omit)	Note A

Table 7.4-1 NITF Text Sub-Header Implementation for NIMA Libraries

7.5 A3I Scenarios and Use Cases (TBD-026)

[Note: Intent of this section is to provide background information on how it is envisioned that the facilities will be used. Future releases of the CIIP will integrate appropriate scenarios with the facility definitions to demonstrate application of the facilities.]